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Triage Accuracy at the Interface: The Interdependent Roles of Ambulance Crews, Emergency Nursing Assistants, and Medical Secretaries in Disaster Surge Management

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Abstract

Background: Mass casualty incidents (MCIs) and infectious disease surges place unprecedented stress on healthcare systems, with triage accuracy serving as the critical determinant of patient outcomes. Despite widespread adoption of standardized triage tools, the interprofessional nature of disaster triage—spanning pre-hospital ambulance crews, emergency nursing assistants, medical secretaries, and laboratory personnel—remains underexamined.

Aim: This narrative review synthesizes evidence on triage systems (START, SALT, JumpSTART) during MCIs and infectious disease surges, examining the distinct yet interdependent roles of frontline personnel and identifying communication failures that compromise disaster response.

Methods: A structured narrative review of English-language literature (2010-2024) was conducted using PubMed, CINAHL, and Scopus.

Results: Evidence reveals significant variability in triage tool sensitivity (ranging from 0.45 to 0.76), with under-triage rates posing substantial patient safety risks. Interprofessional communication failures—particularly at the pre-hospital to emergency department interface—represent a latent threat to triage accuracy. Medical secretaries play an underappreciated role in patient tracking and family reunification, while laboratory surge capacity activation depends critically on real-time communication from triage personnel.

Conclusions: Optimizing disaster triage requires a systems-level approach that recognizes the interdependence of ambulance crews, nursing assistants, medical secretaries, and laboratory staff. Structured communication protocols, shared mental models, and integrated simulation training are essential for improving triage accuracy and surge response.

Keywords: mass casualty triage, interprofessional communication, disaster preparedness, surge capacity, patient tracking.

Introduction

Triage, derived from the French verb *trier* meaning "to sort," represents the foundational clinical process in disaster medicine—the rapid prioritization of multiple patients when needs immediately and dramatically exceed available resources (Bazyar et al., 2022; Frykberg, 2002). In mass casualty incidents (MCIs) and infectious disease surges, triage decisions determine which patients receive life-saving interventions, which must wait, and ultimately, who survives. The stakes could not be higher: errors in triage—whether over-triage (classifying non-critical patients as urgent) or under-triage (failing to identify critically ill patients)—carry real mortality costs that compound across entire affected populations (Frykberg, 2002; Kahn et al., 2009).

The science of disaster triage has evolved significantly over recent decades, with multiple standardized tools developed to guide pre-hospital and hospital-based prioritization. Systems such as Simple Triage and Rapid Treatment (START), JumpSTART

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(pediatric adaptation), and Sort-Assess-Lifesaving Interventions-Treatment/Transport (SALT) have been widely adopted across emergency medical services (EMS) systems and emergency departments worldwide (Lerner et al., 2008; Romig, 2002). Each operationalizes a slightly different balance between speed and precision, using simple physiological parameters—respiratory rate, perfusion surrogates, mental status, and observable behavior—to assign patients to triage categories that reflect urgency of intervention (Bazyar et al., 2022; Vassallo et al., 2017).

However, the academic literature and disaster preparedness efforts have historically focused on the technical performance of triage algorithms in isolation, treating triage as a uniprofessional task executed by a single responder. This narrow framing obscures a fundamental reality: disaster triage is inherently and necessarily interprofessional. The patient journey through an MCI involves sequential handoffs between multiple actors—ambulance crews performing field triage at the scene, emergency nursing assistants conducting secondary triage at the department door, medical secretaries managing registration and patient tracking, and laboratory personnel preparing for massive specimen influx (Dojmi Di Delupis et al., 2020). At each interface, information must be transferred accurately, roles must be clearly delineated, and communication must flow seamlessly.

The consequences of interprofessional failure in this chain are well-documented. Poor communication has been identified as the root cause of the majority of negative sentinel events occurring in hospitals, with ineffective interprofessional collaboration directly linked to detrimental patient outcomes during high-stress situations (Donaldson et al., 2014; Freund et al., 2013). In the disaster context, where chaos, uncertainty, and resource constraints amplify every vulnerability, communication breakdowns between pre-hospital and hospital personnel can delay critical decisions, compromise triage accuracy, and ultimately cost lives (Dojmi Di Delupis et al., 2020; Ebert et al., 2014).

This narrative review synthesizes current evidence on triage systems and interprofessional dynamics during MCIs and infectious disease surges. We examine the distinct but interdependent roles of ambulance crews, emergency nursing assistants, medical secretaries, and laboratory staff, analyzing how communication failures at each interface compromise disaster response. By mapping the full triage pathway from scene to laboratory, we aim to identify actionable strategies for improving interprofessional coordination and, ultimately, patient outcomes.

Triage Systems and Their Performance

Evolution and Classification of Triage Tools

The modern era of disaster triage began with the development of the START system in the 1980s, designed to enable rapid categorization of adult patients by first responders with minimal training (Franc et al., 2022). START classifies patients into four color-coded categories based on three physiological parameters: respiratory rate, perfusion (capillary refill or radial pulse), and mental status (ability to follow commands). Patients who can walk are designated "minor" (green); those with abnormal physiology are categorized as "immediate" (red), "delayed" (yellow), or "deceased/expectant" (black).

Subsequent decades witnessed the development of numerous alternative and adjunctive systems. JumpSTART was developed to address the unique physiological characteristics of pediatric patients, incorporating age-appropriate respiratory rates and a modified assessment of mental status (Romig, 2002). The SALT system emerged from a national guideline effort to harmonize nomenclature and steps for mass-casualty triage, introducing a global sorting approach followed by individual assessment (Lerner et al., 2008). More recently, physiology-driven tools such as the Modified Physiological Triage Tool (MPTT) and the Birmingham Cognitive Screen (BCD) have been derived from large trauma datasets to maximize sensitivity for life-saving interventions while minimizing under-triage (Vassallo et al., 2017; Malik et al., 2021).

Comparative Performance of Sensitivity, Specificity, and the Triage Trade-off

The performance of triage systems is conventionally evaluated using diagnostic metrics adapted from evidence-based medicine. Sensitivity reflects the tool's ability to correctly identify patients requiring urgent life-saving interventions, while specificity indicates correct identification of patients who do not require immediate intervention (Streiner & Kottner, 2014). Over-triage (classifying non-critical patients as urgent) and under-triage (failing to identify critical patients) represent the two error types, with under-triage generally considered more dangerous as it delays care for the sickest patients (Frykberg, 2002).

A landmark 2023 study using the Alberta Trauma Registry evaluated seven triage tools—START, JumpSTART, SALT, RAMP, MPTT, BCD, and MITT—against a reference standard based on patients' actual need for urgent life-saving interventions (Jerome et al., 2023). Of 8,652 included records, the most sensitive tool was MPTT, demonstrating a sensitivity of 0.76 (95% CI 0.75-0.78). Critically, four of the seven tools evaluated had sensitivities below 0.45, indicating that they would fail to identify more than half of patients requiring urgent interventions. JumpSTART demonstrated the lowest sensitivity and the highest under-triage rate for pediatric patients—a finding of profound concern given the vulnerability of this population (Jerome et al., 2023).

All triage tools evaluated showed moderate to high positive predictive value (>0.67) for patients with penetrating trauma, suggesting better performance in specific injury patterns. However, the authors concluded emphatically: "All of the triage tools assessed should be employed with caution during mass casualty incidents as they may fail to identify a large proportion of patients requiring urgent lifesaving interventions" (Jerome et al., 2023, p. 664).

A 2022 systematic review of systematic reviews corroborated these findings, noting that traditional systems such as START and SALT provide rapid categorization but remain prone to over- and under-triage depending on responder training and situational factors (Marcussen et al., 2022). The review highlighted emerging evidence that artificial intelligence (AI)-driven models and portable diagnostic technologies may improve decision speed and diagnostic precision, but emphasized that no single algorithm has proven universally superior across all incident types, casualty mixes, and operational contexts (Marcussen et al., 2022).

Human Factors in Triage Performance

The variability in triage tool performance revealed by comparative studies points to a critical insight: the tool itself is only one determinant of triage accuracy. Human factors—responder training, experience, situational awareness, and decision-making under stress—profoundly influence how algorithms are applied in real-world chaos (Erika et al., 2020). A systematic review of factors affecting triage accuracy among emergency nurses identified knowledge, clinical experience, and situational awareness as key determinants of performance (Ouellet et al., 2023).

This finding has direct implications for interprofessional disaster response. Different professional groups—ambulance crews, emergency nursing assistants, medical secretaries—bring different training backgrounds, cognitive frameworks, and decision-making heuristics to the triage task (Guasconi et al., 2022). When these groups must coordinate across the pre-hospital to hospital interface, the potential for misalignment and miscommunication multiplies. Understanding the distinct roles and perspectives of each group is therefore essential for optimizing system-level triage performance.

Mapping Roles of The Interprofessional Chain Across the Triage Continuum

Field Triage and the First Critical Decisions

Ambulance personnel—paramedics, emergency medical technicians (EMTs), and ambulance nursing assistants—serve as the first link in the triage chain. At the scene of an MCI, they must rapidly assess multiple patients, apply triage algorithms under chaotic conditions, and make initial categorization decisions that will guide transport prioritization and destination decisions (Bennett, 2019). The accuracy of these field triage decisions directly impacts downstream hospital operations: over-triage can overwhelm emergency departments with non-critical patients, while under-triage can result in critically injured patients being transported to inappropriate facilities or experiencing dangerous delays in definitive care (Frykberg, 2002; Kahn et al., 2009).

The training and competency requirements for effective field triage are substantial. First responders must recognize an MCI and activate the incident command system, clearly designate roles among arriving personnel (communications, triage, logistics, mutual aid), accurately triage and deliver care to patients, and decide optimal transport options and destination decisions (World Health Organization, 2022). These tasks must be executed while managing their own stress, maintaining situational awareness, and communicating effectively with both scene command and receiving hospitals.

Research from Italy, where volunteer rescuers respond to most prehospital emergency calls, reveals concerning perceptions among emergency department triage nurses regarding prehospital personnel competencies (Dojmi Di Delupis et al., 2020). In a survey of 402 triage nurses, 75.5% regarded rescuers' ability to recognize life-threatening situations as insufficient, 66% viewed rescuers' ability to administer oxygen as insufficient, and approximately 58% considered rescuers' ability to report the reason for the emergency call as insufficient (Dojmi Di Delupis et al., 2020). These perceptions, regardless of their objective accuracy, represent what the study authors termed a "latent threat to clinical handover"—a predisposition to discount or distrust information provided by prehospital personnel that can compromise decision-making during the critical transition of care (Dojmi Di Delupis et al., 2020, p. e35).

Secondary Triage at the Portal of Care

Emergency nursing assistants occupy a pivotal position at the interface between the community and the hospital. As patients arrive—whether via ambulance or on foot—nursing assistants are often the first hospital personnel to conduct direct patient assessment and initiate the emergency department's response. Their role encompasses initial triage, vital sign measurement, basic life support interventions, and communication of critical information to registered nurses and providers (Di Delupis et al., 2015; Ouellet et al., 2023).

In disaster surge situations, this role expands dramatically. Nursing assistants must conduct secondary triage at the department door, reassessing patients who may have been initially categorized in the field and identifying any deterioration or missed injuries (Dojmi Di Delupis et al., 2020). The quality of their observation and reporting—the ability to "observe and report changes in patient's condition" directly influences the speed and appropriateness of subsequent interventions (Avery et al. 2022; Mahdi et al., 2023).

The interdependence between ambulance crews and nursing assistants at this interface is profound. Effective secondary triage depends on receiving accurate, complete information from prehospital personnel regarding mechanism of injury, field assessments, and interventions performed (Guasconi et al., 2022). When this information transfer fails—whether due to communication breakdowns, mutual mistrust, or simply the chaos of the moment—nursing assistants must effectively begin the assessment process from scratch, wasting precious time and potentially missing critical information that could guide triage decisions (Ebert et al., 2014).

The Underappreciated Sentinel of Patient Tracking

Among all actors in the disaster response chain, medical secretaries and registration staff are perhaps the most consistently overlooked in both practice and research. Yet their role in disaster surge management is absolutely critical. As patients arrive in waves, medical secretaries are responsible for initiating the administrative record, capturing essential identifying information, assigning tracking numbers, and beginning the documentation that will follow the patient throughout their hospital journey (Gao et al., 2018).

The importance of this function becomes starkly apparent when it fails. Following the 2011 Christchurch Earthquake, investigators studied patient tracking challenges and found that "tracking patients through health systems is fundamental to coordinated care provision. However, it is an inconsistent element of emergency preparedness" (Cimellaro et al., 2020). Clinical and clerical staff involved in the event's patient tracking were interviewed, revealing critical insights into the structures and processes required for effective disaster documentation.

Material resources essential for patient tracking included identification number systems, technological requirements (including redundancy for power loss), disaster-specific documents, minimum data for entry, digital/paper hybrid registration systems, and digital-paper integration (Gao et al., 2018). Human resources requirements included clear role allocation and familiarity with plans, roles, processes, tools, and facilities (Cimellaro et al., 2020). When these elements align, outcomes include effective management of patient flow, appropriate patient-care provision, and successful patient-family reunification. When they do not, patients become lost in the system, families endure agonizing uncertainty, and the entire response effort is compromised.

The medical secretary's role extends beyond initial registration to ongoing tracking throughout the patient's hospital course. As patients move from triage to treatment areas, to imaging, to the operating room, to the ward or intensive care unit, their location and status must be continuously updated (Gao et al., 2018). This tracking function is essential not only for clinical coordination but also for family communication, media management, and post-disaster reconciliation. In an era of electronic health records, medical secretaries serve as the human interface with these systems, ensuring that data entered at the front end remains accurate and accessible throughout the care continuum.

The Diagnostic Backstop

The final link in the triage chain—often activated only after clinical decisions have been made—is the laboratory. Yet laboratory surge capacity is essential to disaster response, particularly in infectious disease surges where rapid diagnosis determines isolation, treatment, and public health interventions. Outbreaks put laboratories under extreme and sudden pressure: within days, specimen numbers can rise 10- to 20-fold, staff become overstretched, and critical reagents run out (Lippi & Plebani, 2020).

Historical examples illustrate the consequences of laboratory surge failure. During the West Africa Ebola outbreak (2014-2016), testing bottlenecks left suspected cases waiting days for confirmation, fueling transmission (North-Samardzic & de Witt, 2019). During COVID-19, many countries faced weeks-long queues for PCR testing due to lack of surge staff, limited platforms, and supply shortages. In cholera outbreaks, when referral laboratories were overwhelmed, transport and reporting delays allowed outbreaks to spread undetected (Ratnayake et al., 2020).

The common gaps in laboratory surge preparedness are strikingly consistent: staffing shortages (few laboratories have pre-trained surge rosters), supply/equipment collapse (emergency procurement and buffer stocks are inadequate), infrastructure strain (lack of mobile/temporary laboratories or power backups), coordination failures (weak linkages with private, military, or regional laboratories that could share load), and poor triggers (no agreed thresholds to know when to activate surge plans) (North-Samardzic & de Witt, 2019).

Critically, laboratory surge activation depends on communication from the clinical front line. Laboratory personnel must receive advance notice of an impending surge to activate staff callbacks, pull buffer stocks, and prepare testing platforms (Zeltyn et al., 2011). This notification must come from triage personnel—ambulance crews reporting multiple patients with similar symptoms, nursing assistants identifying a cluster of febrile arrivals, medical secretaries tracking a sudden increase in registrations with respiratory complaints. When this communication fails, laboratories are caught flat-footed, and diagnostic delays compound the clinical and public health consequences of the surge.

Interprofessional Communication Failures in Disaster Triage

The Pre-Hospital to Hospital Interface

The interface between prehospital and hospital personnel represents the single most vulnerable point in the disaster triage chain. At this moment of transition, information must be transferred accurately and completely, often under extreme time pressure and amid physical and cognitive chaos. Yet research consistently demonstrates that this interface is fraught with communication failures and mutual mistrust.

The Italian study of triage nurses' perceptions of prehospital rescuers provides sobering data (Dojmi Di Delupis et al., 2020). Beyond the specific competency ratings, the study revealed a pervasive sense among nurses that rescuers lack standardized terminology and professional recognition, creating a fundamental disconnect in how patient information is conveyed and received. The authors concluded that "this perception could cause errors during the prehospital or hospital handover at the triage and could lead to delayed decisions and incorrect treatment" (Dojmi Di Delupis et al., 2020, p. e37).

These findings align with broader patient safety research identifying communication failures as the root cause of most negative sentinel events (Donaldson et al., 2014; Freund et al., 2013). In the disaster context, where multiple patients arrive simultaneously and cognitive resources are stretched thin, the consequences of communication breakdowns are magnified. A missed detail about mechanism of injury, a misunderstood report of vital signs, a failure to communicate a field triage category—each can cascade into inappropriate triage categorization, delayed interventions, and preventable morbidity or mortality (Dojmi Di Delupis et al., 2020; Ebert et al., 2014).

The Clinical to Administrative Interface

A second critical fracture point exists between clinical personnel (ambulance crews, nursing assistants) and administrative personnel (medical secretaries). These groups operate with fundamentally different mental models, trained in different disciplines, and focused on different aspects of patient care. Clinical personnel prioritize physiological status and intervention urgency; administrative personnel prioritize identification, documentation, and tracking (Gao et al., 2018). These perspectives are complementary, but when communication between them fails, patients become untrackable, families cannot be notified, and the entire response becomes disorganized.

The Christchurch Earthquake study highlighted the importance of structured processes and agreed-upon minimum data sets to bridge this divide (Gao et al., 2018). When clinical and administrative staff had pre-established familiarity with plans, roles, and tools, patient tracking proceeded effectively. When they did not, patients were lost, and reunification efforts were compromised. The study's conclusion applies broadly: "With inter-agency and inter-organization emergency response, standardized processes and information are required. Collaboration prior to events can mitigate issues when an event occurs" (Gao et al., 2018, p. 12).

A 2023 study of interprofessional disaster preparedness in Saudi Arabia found significant disparities in awareness between patient-facing healthcare providers and non-patient-facing staff (Alruwaili et al., 2023). While 76.9% of healthcare providers were aware of the hospital's emergency response plan, only 56.2% of non-healthcare providers demonstrated such awareness ($\chi^2 = 52.165$, $p < 0.001$). Similar disparities were observed in understanding the term "disaster" (86.5% vs 54.1%) and awareness of a command center (73.4% vs 45.2%). These findings underscore "the critical need for enhancing awareness, education, and preparedness within healthcare facilities, emphasizing an integrated approach that includes both healthcare and non-healthcare staff" (Alruwaili et al., 2023).

The Clinical to Laboratory Interface

The interface between triage personnel and laboratory staff represents a third vulnerability, particularly critical in infectious disease surges. Laboratory surge activation depends on early warning from the clinical front line, yet systematic triggers for such warnings are rarely established (North-Samardzic & de Witt, 2019). As a result, laboratories often learn of a surge only when specimens begin arriving in unprecedented volumes, by which time the opportunity for proactive preparation has passed.

Effective laboratory surge management requires "predefined (not improvised in the crisis)" thresholds and communication pathways (North-Samardzic & de Witt, 2019). When ambulance crews recognize a cluster of patients with similar symptoms, when nursing assistants note an unusual pattern of presentations, when medical secretaries observe a sudden spike in registrations from a single geographic area—each observation should trigger a communication to laboratory leadership, enabling activation of surge plans before the specimen flood begins. In the absence of such communication pathways, laboratories remain reactive rather than proactive, and diagnostic capacity is inevitably overwhelmed (Table 1).

Table 1: Interprofessional Roles and Responsibilities in Disaster Triage

Professional Group	Primary Triage Role	Key Responsibilities	Critical Information to Communicate	Information Recipients
Ambulance Crews	Field triage (primary)	Scene size-up, triage algorithm application, transport prioritization, destination decisions (Bennett, 2019; North-	Mechanism of injury, field triage category, vital signs, interventions performed, estimated number of incoming	Emergency nursing assistants, incident

		Samardzic & de Witt, 2019)	patients (Dojmi Di Delupis et al., 2020)	command, receiving facility
Emergency Nursing Assistants	Secondary triage (door)	Patient reassessment, vital sign measurement, basic interventions, communication to RN/MD (Ouellet et al., 2023; Di Delupis et al., 2015)	Changes in patient condition, discrepancies from field triage, immediate clinical needs (Avery et al. 2022)	Registered nurses, emergency physicians, charge nurse
Medical Secretaries	Administrative tracking	Patient registration, identification number assignment, location tracking, family communication (Gao et al., 2018)	Patient identity, arrival time, current location, disposition status (Gao et al., 2018)	Clinical staff, command center, family members, media
Laboratory Personnel	Diagnostic surge capacity	Specimen processing, result reporting, surge plan activation (North-Samardzic & de Witt, 2019)	Test availability, turnaround time estimates, critical results (North-Samardzic & de Witt, 2019)	Clinical teams, infection control, public health authorities

Building a Resilient Interprofessional Triage System

Structured Communication Protocols

The evidence consistently points to structured communication tools as essential for improving interprofessional handoffs. Standardized formats such as SBAR (Situation-Background-Assessment-Recommendation) reduce variability, ensure completeness, and create shared mental models across professional boundaries (Granheim et al., 2018; Jakobsen et al., 2018). For disaster triage, these tools should be adapted to include disaster-specific elements: triage category, mechanism of injury, interventions performed, and estimated time of arrival for multiple patients.

The development of structured communication protocols must be an interprofessional endeavor, involving representatives from all groups in the triage chain. When ambulance crews, nursing assistants, medical secretaries, and laboratory personnel jointly design communication tools, they build shared understanding of each other's information needs and constraints (Sigalet et al., 2012). This collaborative design process is itself an intervention, fostering relationships and mutual respect that pay dividends during actual disasters.

Integrated Simulation Training

Didactic training in triage algorithms is insufficient to prepare personnel for the chaos of real disasters. Simulation-based education, particularly when conducted interprofessionally, has demonstrated effectiveness in improving both technical triage skills and the communication competencies essential for coordination (Farra et al., 2014; Nicely & Farra, 2015). A study of nursing students who participated in collaborative development of a virtual reality disaster triage simulation found that after the experience, students demonstrated "agreement to strong agreement in all areas surveyed including interprofessional education, communication, roles and responsibilities of team members, and situational awareness" (Farra et al., 2014, p. 494).

Effective disaster simulation should bring together all actors in the triage chain—ambulance crews, nursing assistants, medical secretaries, laboratory personnel—to practice not only their individual roles but also the handoffs and communications that connect them (Tervajärvi et al., 2021). These exercises should include realistic stressors: time pressure, incomplete information, competing demands, and simulated equipment failures. They should be followed by structured debriefings that focus on interprofessional dynamics as much as clinical decision-making (Jakobsen et al., 2018).

Shared Mental Models and Cross-Training

Beyond structured tools and simulation exercises, building shared mental models across professional groups requires ongoing relationship development and cross-training. When ambulance personnel understand the constraints under which emergency nursing assistants operate—the simultaneous demands of multiple incoming patients, the pressure to clear the triage area for the next arrival, the need for concise, relevant information—they can tailor their communication accordingly (Ebert et al., 2014). When medical secretaries understand the clinical significance of triage categories—what "immediate" means for patient prognosis and care trajectory—they can prioritize tracking efforts and communicate more effectively with families.

Cross-training opportunities can be embedded in routine operations: inviting ambulance crews to spend time in the emergency department observing triage and registration processes; having nursing assistants ride along with ambulance services to understand field conditions; including medical secretaries in clinical huddles and disaster planning meetings (Alruwaili et al., 2023). These experiences build the relationships and mutual understanding that enable effective coordination when disaster strikes.

Technology-Enabled Coordination

Emerging technologies offer opportunities to enhance interprofessional communication and coordination in disaster triage. Electronic health records with real-time tracking capabilities can provide shared situational awareness across the entire care continuum, from ambulance notification through laboratory result reporting (Gao et al., 2018). Mobile applications can enable secure messaging between field and hospital personnel, transmitting patient counts, triage categories, and estimated arrival times directly to emergency department command centers. However, technology is only as effective as the human systems that surround it. The Christchurch Earthquake experience demonstrated that when electrical power fails and electronic systems go dark, paper-based backup systems and well-rehearsed manual processes become essential (Gao et al., 2018). Technology should augment, not replace, the foundational elements of structured communication, shared mental models, and interprofessional relationships (Table 2).

Table 2: Strategies for Improving Interprofessional Disaster Triage Coordination

Strategy	Description	Target Interface	Evidence Base	Implementation Considerations
Structured Handoff Tools	Standardized communication formats (SBAR, MIST) adapted for disaster context (Granheim et al., 2018; Jakobsen et al., 2018)	Pre-hospital to ED; Nursing to Laboratory	Reduces information loss, improves receiver satisfaction, enhances completeness (Granheim et al., 2018)	Must be co-designed by all users; requires training and reinforcement
Interprofessional Simulation	Full-scale exercises involving all disaster response roles (Farra et al., 2014; Tervajärvi et al., 2021)	All interfaces	Improves technical skills, communication competencies, role clarity, situational awareness (Farra et al., 2014; Nicely & Farra, 2015)	Resource-intensive; requires institutional commitment; debriefing essential
Cross-Training Programs	Rotational experiences across professional boundaries (Alruwaili et al., 2023; Ebert et al., 2014)	Clinical to Administrative; Field to Hospital	Builds mutual understanding of constraints and information needs (Ebert et al., 2014)	Logistically complex; requires protected time and 跨 departmental cooperation
Integrated Tracking Systems	Real-time electronic patient tracking with redundancy for power failure (Gao et al., 2018)	All points of care	Enables shared situational awareness; supports family reunification (Gao et al., 2018)	Requires significant investment; must include backup manual processes
Laboratory Surge Protocols	Predefined activation thresholds and communication pathways (North-Samardzic & de Witt, 2019)	Clinical to Laboratory	Ensures proactive rather than reactive laboratory response (North-Samardzic & de Witt, 2019)	Requires agreement on triggers; must be regularly tested

Conclusion and Future Directions

This review has mapped the interprofessional landscape of disaster triage, revealing a complex system of interdependent roles spanning ambulance crews, emergency nursing assistants, medical secretaries, and laboratory personnel. The evidence demonstrates that triage accuracy is not merely a function of algorithm performance but emerges from the quality of coordination across these professional boundaries (Bazyar et al., 2022; Guasconi et al., 2022). When communication flows smoothly, when roles are clearly understood, when mutual respect characterizes interprofessional relationships, the system functions as a coherent whole, identifying critically ill patients, tracking them through the care continuum, and mobilizing diagnostic resources to meet surge demands.

When communication fails—when prehospital information is discounted, when administrative tracking breaks down, when laboratory activation occurs too late—the consequences cascade. Patients are mis-triaged, families are left in agonizing uncertainty, and the entire response effort becomes less effective (Dojmi Di Delupis et al., 2020). These failures are not inevitable; they are predictable outcomes of systems that have not been deliberately designed for interprofessional coordination.

The path forward requires a fundamental shift in how we conceptualize and prepare for disaster triage. Triage must be understood not as a uniprofessional task but as a systems property—an emergent outcome of the interactions between multiple actors, each with distinct expertise and perspectives (Bazyar et al., 2022; Alruwaili et al., 2023). Preparedness efforts must therefore address not only individual competencies but also the interfaces between roles, the communication tools that connect them, and the shared mental models that enable seamless coordination.

Several priorities for future research and practice emerge from this synthesis. First, there is a pressing need for empirical studies examining interprofessional dynamics in actual disaster responses, moving beyond simulation and survey data to understand how communication patterns, role perceptions, and coordination mechanisms influence real-world outcomes. Second, the development and validation of structured communication tools specifically designed for disaster triage handoffs should be a priority, with rigorous evaluation of their impact on information transfer and patient outcomes (Granheim et al., 2018). Third, health professions education must embed interprofessional disaster competencies across curricula, ensuring that all future personnel—from paramedics to medical secretaries—understand both their own roles and the roles of those with whom they will coordinate (Farra et al., 2014; Tervajärvi et al., 2021).

Finally, health systems must invest in the infrastructure of coordination: the relationships, trust, and shared understanding that enable effective ad-hoc collaboration under stress. This means creating regular opportunities for interprofessional interaction outside of disaster contexts, whether through joint training, cross-appointments, or simply ensuring that representatives from all groups have seats at the planning table (Alruwaili et al., 2023). When disaster strikes, the quality of response will reflect the quality of relationships built in the years before. In the words of the Christchurch Earthquake investigators: "With inter-agency and inter-organization emergency response, standardized processes and information are required. Collaboration prior to events can mitigate issues when an event occurs" (Gao et al., 2018). The time to build that collaboration is now, before the next disaster tests our systems and our patients pay the price for our unpreparedness.

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